

WHAT IS CLAIMED IS:

1. A ferroelectric memory comprising:

a plurality of ferroelectric capacitors, each of which includes a lower electrode, a capacitor dielectric film of a ferroelectric film and an upper electrode successively formed
5 on an interlayer insulating film on a semiconductor substrate, said plurality of ferroelectric capacitors being arranged along a word line direction and a bit line direction,

wherein a first insulating hydrogen barrier film is filled between said lower electrodes of some ferroelectric capacitors, among said plurality of ferroelectric capacitors, that are arranged along one direction out of said word line direction and said bit line
10 direction,

said capacitor dielectric film is formed as a common capacitor dielectric film commonly used by said some ferroelectric capacitors arranged along said one direction and formed on said lower electrodes of said some ferroelectric capacitors arranged along said one direction and on said first insulating hydrogen barrier film,

15 said upper electrode is formed as a common upper electrode commonly used by said some ferroelectric capacitors arranged along said one direction and formed on said common capacitor dielectric film, and

a second insulating hydrogen barrier film is formed to cover said common upper electrode.

20 2. The ferroelectric memory of Claim 1,

wherein said second insulating hydrogen barrier film is formed separately with respect to every capacitor line including some ferroelectric capacitors arranged along said one direction.

3. The ferroelectric memory of Claim 1,

25 wherein said second insulating hydrogen barrier film is formed to cover a pair of

capacitor lines adjacent to each other along the other direction out of said word line direction and said bit line direction among capacitor lines each including some ferroelectric capacitors arranged along said one direction.

4. The ferroelectric memory of Claim 1,

5 wherein a conducting hydrogen barrier film is formed between a contact plug formed in said interlayer insulating film and said lower electrodes.

5. The ferroelectric memory of Claim 4,

wherein every capacitor line including some ferroelectric capacitors arranged along said one direction is completely covered with said conducting hydrogen barrier film,
10 said first insulating hydrogen barrier film and said second insulating hydrogen barrier film.

6. The ferroelectric memory of Claim 1,

wherein a level reducing film for reducing a level difference caused in a peripheral portion of said common upper electrode is formed between said common upper electrode and said second insulating hydrogen barrier film.

15 7. The ferroelectric memory of Claim 1,

wherein said first insulating hydrogen barrier film is made from a Si_3N_4 film, a SiON film, an Al_2O_3 film, a TiO_2 film or an oxide or oxide nitrided film of an alloy of Ti and Al.

8. The ferroelectric memory of Claim 1,

20 wherein said second insulating hydrogen barrier film is made from a Si_3N_4 film, a SiON film, an Al_2O_3 film, a TiO_2 film, a TiN film, an alloy film of Ti and Al, or an oxide, nitride or oxide nitrided film of an alloy of Ti and Al.

9. The ferroelectric memory of Claim 4,

wherein said conducting hydrogen barrier film is made from an alloy film of Ti
25 and Al, a nitride or oxide nitrided film of an alloy of Ti and Al, or a TiN film.

10. A method for fabricating a ferroelectric memory including a plurality of ferroelectric capacitors, each of which has a lower electrode, a capacitor dielectric film of a ferroelectric film and an upper electrode successively formed on an interlayer insulating film on a semiconductor substrate, said plurality of ferroelectric capacitors being arranged
5 along a bit line direction and a word line direction, comprising the steps of:

forming said lower electrodes of said plurality of ferroelectric capacitors on said interlayer insulating film;

depositing a first insulating hydrogen barrier film on said interlayer insulating film and said lower electrodes and planarizing said first insulating hydrogen barrier film,
10 whereby filling said first insulating hydrogen barrier film between said lower electrodes of some ferroelectric capacitors, among said plurality of ferroelectric capacitors, that are arranged along one direction out of said word line direction and said bit line direction;

forming, on said lower electrodes of said some ferroelectric capacitors arranged along said one direction and on said first insulating hydrogen barrier film, said capacitor
15 dielectric film as a common capacitor dielectric film commonly used by said some ferroelectric capacitors arranged along said one direction;

forming, on said common capacitor dielectric film, said upper electrode as a common upper electrode commonly used by said some ferroelectric capacitors arranged along said one direction; and

20 forming, on said common upper electrode, a second insulating hydrogen barrier film covering said common upper electrode.

11. The method for fabricating a ferroelectric memory of Claim 10,

wherein said second insulating hydrogen barrier film is formed separately with respect to every capacitor line including some ferroelectric capacitors arranged along said
25 one direction.

12. The method for fabricating a ferroelectric memory of Claim 10,

wherein said second insulating hydrogen barrier film is formed to cover a pair of capacitor lines adjacent to each other along the other direction out of said word line direction and said bit line direction among capacitor lines each including some ferroelectric capacitors arranged along said one direction.

13. The method for fabricating a ferroelectric memory of Claim 10, further comprising, before the step of forming said lower electrodes, a step of forming a conducting hydrogen barrier film between a contact plug formed in said interlayer insulating film and said lower electrodes.

14. The method for fabricating a ferroelectric memory of Claim 13,

wherein every capacitor line including some ferroelectric capacitors arranged along said one direction is completely covered with said conducting hydrogen barrier film, said first insulating hydrogen barrier film and said second insulating hydrogen barrier film.

15. The method for fabricating a ferroelectric memory of Claim 10, further comprising, between the step of forming said upper electrode and the step of forming a second insulating hydrogen barrier film, a step of forming, between said common upper electrode and said second insulating hydrogen barrier film, a level reducing film for reducing a level difference caused in a peripheral portion of said common upper electrode.

16. The method for fabricating a ferroelectric memory of Claim 10,

wherein said first insulating hydrogen barrier film is made from a Si_3N_4 film, a SiON film, an Al_2O_3 film, a TiO_2 film or an oxide or oxide nitrided film of an alloy of Ti and Al.

17. The method for fabricating a ferroelectric memory of Claim 10,

wherein said second insulating hydrogen barrier film is made from a Si_3N_4 film, a SiON film, an Al_2O_3 film, a TiO_2 film, a TiN film, an alloy film of Ti and Al, or an oxide,

nitride or oxide nitrided film of an alloy of Ti and Al.

18. The method for fabricating a ferroelectric memory of Claim 13,
wherein said conducting hydrogen barrier film is made from an alloy film of Ti
and Al, a nitride or oxide nitrided film of an alloy of Ti and Al, or a TiN film.

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